

The double ring hitch assembly is comprised of the coupler guide which is generally designated by reference 16, and the double ring coupler hitch, which is generally designated by reference 18. FIG. 1 is an exploded perspective view of the coupler guide 16 and the double ring coupler 18 and illustrates their structural relationship. The coupler guide 16 consists of a hollowed spherical housing 6 having opposite entrance holes 8 being vertically aligned to allow for the insertion of a locking pin 12. The locking pin 12 is shown as "T" shaped with a handle grip 10, but is not limited to this shape. It has a hole 14 at its base for insertion of a locking pin. Extruding horizontally from the spherical housing 6 is a rectangular shaft 2 which inserts into the interior channel of a class 2 or class 3 towing vehicle hitch. The coupler guide 16 has four guide walls 20, 22, 24 and 26 which converge rearwardly into a circular opening of the spherical housing 6. The preferred embodiment shows the outer perimeter formed by these four guide walls 20, 22, 24 and 26 as rectangular in shape, but the present invention is not limited to said rectangular shape.

The double ring coupler hitch is illustrated in more detail in FIGS. 2, 3 and 4. It is comprised of an annulus shaped outer ring 30 whose exterior surface 34 is spherically shaped, i.e., with the same convex curvature as the interior concave curvature of the spherical housing 6. The outer ring 30 has a circular hole 36 cut through its center so that the interior surface 38 of the outer ring 30 is also concavely curved as the section of a sphere. The inner ring 40 is also annulus shaped with a convexly curved outer surface 42 with the same spherical curvature as the inner surface 38 of the outer ring 30. The inner ring 40 has a hole 46 cut through its center for insertion of the coupler pin 10 between the hole 46 and the outer surface 42. The inner ring 40 has a level lip 44 on both sides. The inner ring 40 fits within the outer ring 30 as illustrated in FIGS. 2, 3 and 4. The concave inner surface 38 of the outer ring 30 covers the outer surface 42 of the inner ring 40 enough to prevent the inner ring 40 from being removed.

The outer ring **30** has a cylindrical shaft **32** which extends horizontally from its outer surface **34** into a hitch box **48**. The hitch box **48** has drilled holes for attachment to a trailer hitch tongue. The relative shapes of the inner ring **40** and outer ring **30** are structurally parallel such that the outer ring **30** can rotate about the inner ring **40** 360 degrees about any axis, vertical, horizontal or continuously in between.

When mounted to the rear of a towing vehicle, the coupler guide **16** extends perpendicularly from the rear of the towing vehicle which is slowly backed toward the towed vehicle. The double ring coupler assembly **18** extends perpendicularly from the front of the towed vehicle. When the outer

ring 30 comes in contact with the inside of one of the four coupler guide walls 20, 22, 24 or 26, the double ring coupler 18 is guided along the inside of the coupler guide walls 20, 22, 24 and 26 which converge and guide the double ring coupler 18 into the spherical housing 6. Once engaged, the coupler pin 10 falls through the hole 8 in the spherical housing 6 and through the hole 46 of the inner ring 40. The inner ring 40 is then locked in place except that it may rotate in either direction about the vertical axis of the locking pin 10. Once so engaged and locked, FIG. 6 illustrates the operational association between the double ring hitch 18 and the coupler guide 16. With the locking pin 10 in place, the double ring hitch 18 is allowed to rotate three dimensionally about the inner ring 40 and within the spherical housing 6 continuously anywhere within the physical boundaries defined by the coupler guide walls 20, 22, 24 and 26. The relative shapes of the inner ring 40, the outer ring 30, and the spherical housing 6 provide a means by which the towed trailer has substantially more freedom of movement both vertically and horizontally relative to the towing vehicle than has been produced or allowed by any prior art.

What we claim is:

1. An improved trailer hitching apparatus comprising:

- a plurality of connected guide walls or flanges which converge rearwardly into a substantially spherical housing having a substantially circular opening into said spherical housing where said guide walls converge;

means attached to said spherical housing for mounting said apparatus to a towing vehicle;

- a double-ring coupler device having two substantially annulus-shaped rings, formed so that one outer ring houses the other inner ring as follows: the outer convex surface of said inner ring has the same curvature shape as the inner concave surface of said outer ring, with said outer ring somewhat overlapping said inner ring to hold them together operationally, allowing said outer ring to rotate freely on any axis about said inner ring;

a shaft attached to said outer ring having means to attach said coupler device to a trailer tongue;

said spherical housing having an inner surface with the same spherical curvature as the outer surface of said outer ring so that said outer ring can rotate freely and smoothly about any axis within said spherical housing;

said spherical housing having circular surface openings situated opposite each other and said inner ring of said coupler device having a circular hole which aligns with said surface openings as means for insertion of a locking pin device to securely engage said double-ring coupler device within said spherical housing.

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